

McClure Bridge
Spanning the North Fork of the Palouse River
on Alvergott Road
Palouse Vicinity
Whitman County
Washington

HAER No. WA-25

HAER
WASH,
38-PALO.V,
1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
Western Regional Office
National Park Service
U. S. Department of the Interior
San Francisco, California 94102

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38-PALO.
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HISTORIC AMERICAN ENGINEERING RECORD

MC CLURE BRIDGE

HAER No. WA-25

Location: Mile Post 0.68 Altergott Road (County Road No. 2420) spanning Palouse River, southwest ca. 0.2 miles to Federal Aid Secondary (FAS) Highway 272, ca. 4.0 miles southeast on FAS 272 to City of Palouse, Palouse vicinity, Whitman County, Washington

U.S.G.S. 7.5 minute Elberton, Washington, quadrangle,
Universal Transverse Mercator coordinates:
11.488995.5199095

Date of construction: 1908

Engineer: E. G. Murray (Whitman County Engineer)

Architect: Al Smith and P. A. Tilmont

Builder: O. H. Horton

Present Owner: Whitman County
Department of Public Works
P.O. Box 430
Colfax, Washington 99111

Present Use: Vehicular Bridge
To be demolished 1989

Significance: The McClure Bridge is one of only two remaining timber Pratt Truss Bridges in Washington. Although first framed in timber, (the Pratt Truss Bridge was patented in 1844), iron and steel later prevailed as primary building materials. The McClure Bridge is historically important locally because of its role in social, agricultural, and economic development. The bridge was listed in the National Register of Historic Places in 1982.

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Date: July 1989

DESCRIPTION

The McClure Bridge (see photos WA-25-1 through WA-25-13) spans the North Fork of the Palouse River on the Altergott Road, a two-lane gravel surfaced county road, in Section 21, Township 17 North Range 45 E.W.M., Whitman County, Washington. The City of Palouse is the nearest incorporated town, located ca. 4.0 miles southeast of the bridge on Federal Aid Secondary (FAS) Road No. 272. To the north and south of the bridge the land rises to nearly level uplands, with the structure being situated in a low-lying area of the surrounding countryside. On Altergott Road a horizontal curve precedes the northeastern approach to the bridge and a very steep grade approaches the structure from the southwest.

The McClure Bridge is located in a remote, serene, and lightly traveled area of rural eastern Whitman County. No other physical structures are visible from the bridge site. Soil types at the bridge crossing consist of thin basaltic rock layers with a deep underlying bed of green sand. An open grassy area lies immediately to the east of the bridge. Low lying grasses and stinging nettles are the principal undergrowth at the bridge site. The area adjacent to the river banks is fairly well forested with both coniferous and deciduous trees, Ponderosa Pine being the most plentiful tree at the location. Hawks, herons, and various other small birds are common in the vicinity, as well as small mammals, including raccoons, badgers, and skunks. Deer also frequent the area.

In the spring of 1908, the Whitman County Commissioners placed a Call for Bids in the Colfax Gazette for construction or reconstruction of nine bridges in Whitman County, of which the proposed McClure Bridge was one. The sealed bids were received up to 2:00 o'clock p.m. on 5 February 1908 and contracts signed later the same day. Eleven contractors bid on the McClure Bridge project, and the contract was subsequently awarded to "A. Volk [of Pullman, Washington] for \$2,275.00. This being the lowest bid." On 3 March 1908 the County Commissioners and Mr. Volk signed contract #65430 for construction of the project. County road crews conducted preliminary survey work for the bridge on 26 August 1908.

Designed as a "Combination Highway bridge", the McClure Bridge is an example of the timber Pratt truss style of bridge architecture. The truss configuration in bridge building was first introduced in America in Colonial times. Of simple design, the truss is formed by adding diagonal members to ladder-like framed structures. The truss can run from abutment to abutment (the solid supports at the ends of the bridge) or, if there are wider distances to span, from pier to pier (the supports between the abutments).

When bisected by a diagonal, the rectangular truss forms two triangles, which are rigid. In theory, a triangle formed of rigid materials is indestructible; however, the strength of the form depends largely on the strength of the connecting materials. In brief, pressure applied to various points of the triangle cause compression in some members and tension in others. The dynamics of pressure and compression was the

principal concern of bridge designers who were experimenting with the truss configuration.

The patenting of the Howe Truss Bridge in 1840 represented an important advance in bridge engineering. At that time Elias Howe introduced the use of wrought iron into bridge design, where formerly timber was used. The use of iron simplified the appearance of the bridge by reducing the number of diagonals in the truss. Because wood was an inferior material for members under tension, Howe introduced wrought iron rods for vertical tension members. The rods extended through both the top and bottom chords (horizontal members of the structure). Nuts were then attached to the threaded end of the rods so that the bridge could be periodically tightened.

The Pratt Truss Bridge, designed in 1844 by an American father and son engineering team Caleb and Thomas Pratt, modified the Howe Truss. The Pratt Truss featured the diagonal iron rods in tension, a reversal of the Howe design. Although originally framed in timber, with the availability of iron, and later with the introduction of steel, by 1900 iron and steel prevailed in the construction of Pratt Truss bridges, those materials having proved especially successful when coupled with the Pratt Truss design.

The Pratt Truss also lent itself particularly well to bridge building in the West, where distances were wide and skilled labor at a premium. With its simple pin connections, fabrication occurred mainly in the factory and parts assembled in the field. The McClure Bridge is an example of a bridge built in a popular design of the period, as modified by the advent of new building materials and as influenced by the demands and limitations of the western landscape. In addition, the bridge is also unique in that it is constructed of timber (the material originally specified by its designers) at a time when iron and steel prevailed in the fabrication of Pratt Truss bridges.

As listed under "Work to be Done" in the specifications for the McClure Bridge, the contractor's responsibilities included "furnishing and erecting a 120 foot Combination Truss bridge 18 ft. roadway...clearing site of old bridge, furnishing the necessary material for the staging and false work; shall erect and adjust all metal and woodwork; put in place all floor timbers, guards, handrails, approaches, etc.; ready for use". Other items listed under "Work to be Done" included specifications for Details of Construction, Screw Ends, Turnbuckles, Minimum Size of Rods, Eye Bars, Area, Rods, Pins, Nuts, Gamber, Stringers, Truss Members, Flooring, Quality of Material, Cast Iron, Painting, Substructure, and Approaches (see reduced copy of original "Work to be Done", pp. 7-8).

The single span bridge measured 120 feet in length, 18 feet in width, and the height of the truss was 20 feet. As stated in the plans, the bridge was designed to "carry a uniform live load at 60 [pounds] per live load or a ten ton engine" (see photo WA-25-12).

Although Volk was initially awarded the contract to build the bridge, according to J. M. McLaw, who inspected the bridge on 24 August 1909, O. H. Horton of Colfax was the contractor who completed the project. Horton's bid of \$2,645.00 was the second lowest bid submitted to the county commissioners at the February 1908 bid opening.

The McClure Bridge has undergone extensive replacement and renovation activities over the years. The original plans and specifications called for railings on each side of the bridge. However, the 1953 Whitman County Bridge Record stated that the railing was not put into place until that year (see photo WA-25-8). In addition to the railing, according to the 1953 Bridge Record, further additional "major work consisted of replacing all Timber Truss Members with Treated Materials. Replaced Floor System and 3 Approach Spans." Cost of replacement of the original timber bridge members was \$30,364.00. Construction of the McClure Bridge's existing four concrete abutments (see photo WA-25-5) was not mentioned in the 1953 Bridge Record. This indicates that the double wooden bents called for in the original plans and specifications were replaced some time before that year. In the 1960s metal "Flashing" was added to the diagonal and top beam members of the truss in order to help protect the wooden members from weathering. According to the McClure Bridge Replacement Report prepared by Whitman County in 1988-89, at present "the steel loop welded eyebars and the adjustable cylindrical rods which serve as diagonals and counters in the Pratt configuration are the only remaining original members [of the bridge]."

HISTORICAL BACKGROUND

Topography, early agricultural development, lumbering, and the advance of railroads into Whitman County were among the forces that influenced site selection and construction of the McClure Bridge. Foremost, the crossing at the bridge site is one of the few accessible fordings along the winding North Fork of the Palouse River. The river flows through areas of rugged basalt bluffs in its roughly 23 mile journey between Palouse City and its juncture with the main channel of the Palouse River at Colfax.

The McClure Bridge was erected slightly downstream from an existing bridge which crossed the river on the country road then known as "LaDow Road." A siding located ca. 3.0 miles to the northeast on the Spokane and Inland Empire Railroad, LaDow contained a "Farmer's Warehouse," one of several grain and produce storage warehouses located along various rail lines in the vicinity during the early 1900s.

The existing bridge was named for a family of early settlers in the area, probably the W. H. H. McClure Family. Among other land holdings in the vicinity, McClure owned the section of land adjoining the future bridge site immediately to the southwest, in Sec. 29, T17N, R45 E.W.M. Reportedly, McClure acquired the property before 1882. In that year McClure distinguished himself by traveling to Walla Walla, Washington Territory, there meeting the Reverend Thomas McBride Morgan, his wife and eight children, and escorting the Morgans to his farm, where the family subsequently took up residence. McClure recruited the Reverend Morgan to serve in the Eden Valley Church, a frame building constructed in 1881 in the southeast quarter of McClure's property. Reportedly, the Eden Valley Church of Christ was the first Christian Church formally established in Whitman County. New converts to the congregation were

baptized in the nearby Palouse River, very likely at the crossing later occupied by the McClure Bridge. The Eden Valley Church still stands today and is owned by the Sunshine Club of Palouse.

According to local sources Eden Valley was named for one "Uncle Johnny Fisher," who in the 1870s settled a Timber Culture claim on a quarter section of land, located ca. 1.0 mile west of the future site of the McClure Bridge. Local legend holds that Fisher named the area "Eden Valley". However, according to Hitchman's Place Names of Washington, officials from the Northern Pacific Railroad Company named the valley for the "beautiful gardens" developed by George W. Hill. Eden Valley was one of the earliest settled areas near Colfax. The Eden Valley School was established on Fisher's land between 1879-1881.

Principally an agricultural area, by 1897 Eden Valley, along with Whitman County in general, enjoyed an era of prosperity that continued for roughly the next twenty-five years. Although wheat dominated as the primary cash crop in the area during that period, the North Fork of the Palouse was notable for the development of other diverse and successful agricultural enterprises, including dairying, poultry raising, truck gardening, bee culture, and fruit raising.

Before construction of the McClure Bridge in 1908 the timber industry dominated the economy of the Palouse Country. As yet, agricultural concerns were secondary compared to the importance of supplying building materials to new emigrants. Beginning with the first wave of settlement into the open high rolling prairies of the Palouse Country in the 1870s, an influx which continued unabated into the first decade of the twentieth century, the regions' few sawmills struggled to meet the demands of the rapidly increasing population. Moving the maximum amount of board feet of lumber to the area's mills became the primary focus of settlement activity. The North Fork of the Palouse filled a vital role in this effort.

By the early 1880s sawmills had been established along the river at Colfax, Elberton, and Palouse City (later shortened to "Palouse"). At first, lumber companies concentrated on the growth of timber along the river's heavily wooded banks to supply their mills. But as the river timber was depleted, timber concerns initiated spring log drives in order to move timber from forests farther upstream in Idaho to the mill sites. Dams were built at some sawmills to reserve enough water to keep logs moving downstream, and, hopefully, to help prevent log jams, as the following description in the Palouse Story indicates.

"One of the largest and most interesting [log drives] took place in 1907 on its way to Colfax....It took thirty-five men eighteen days to get the four and a half million feet of logs through Palouse. There was not enough water to keep the logs moving so each night the big dam at Potlatch would be opened enough to allow a big wave of water sufficient to carry the logs down the river on a days journey" (p. 26).

Undoubtedly, the threat of damage to bridges, owing to the log jams and periodic flooding caused by the log drives, restricted bridge construction on the North Fork of

the Palouse. Certainly it is no coincidence that the last log drive on the river in 1908 and the building of the McClure Bridge occurred the same year. Similarly, the decision to use timber in construction of the bridge may have resulted from the convenience of one last opportunity to raft lumber for the bridge from the nearby Palouse mill. Statistics seem to support this conclusion: of the nine bridges built in Whitman County in 1908, only the McClure Bridge was of timber construction. By that year the services of the Washington, Idaho and Montana Railway Company had made log drives on the river obsolete. With the railroads' direct line from Idaho timber holdings to the Potlatch Mill in Palouse, then the largest sawmill in the area, reliance on Palouse River waterways for moving timber ended, and the era of railway transportation came into its own.

The growth of rail transportation into the Palouse Country also directly influenced the construction of the McClure Bridge. The bridge was constructed in order to facilitate vehicular travel between the county seat of Colfax and the town of Garfield, located ca. 17.0 miles to the northeast. At that time Garfield was the major railroad center in the region. Six trains, representing three different rail lines, each made round trips daily to Spokane--Spokane then, as now, being the largest city in eastern Washington. Besides providing passenger service to Spokane, Garfield was also a major agricultural shipping point. By 1900 ten storage warehouses in Garfield served local area farmers. Clearly, a bridge was needed which could accommodate the weight limits representative of the new threshing machines and the eight to ten low-wheeled, wide-axled bundle wagons which came into widespread use on local farms during the early 1900s--machinery which helped keep the warehouses full. Accordingly, in 1908 Whitman County acquired by quit claim deed from Nellie Phelps the 0.33 acres of land on which to build the McClure Bridge.

Although vehicular traffic over the years has remained light (an average of 39 vehicles per day crossed the bridge in 1988) the bridge is still a vital connecting link in the Whitman County road system, particularly in regard to moving agricultural products to local storage, market and shipping centers. However, owing to the increased size and weight of modern agricultural equipment the McClure Bridge can no longer adequately serve public needs. For example, today grain harvester headers typically range between 16 feet and 24 feet in width, with some headers exceeding those widths. Consequently, during grain harvest some farmers reportedly detour around the narrow McClure Bridge, simply driving their self-propelled combines through the river.

Similarly, the McClure Bridge cannot support current legal load limits. The existing bridge can carry loads of 7 tons, 12 tons, 18 tons and 23 tons for 2 axle, 3 axle, 4 axle and 5 axle vehicles, respectively, and meets design loads of HS-10, which is inadequate for modern day traffic. Current design loading standards call for an HS-20 loading capacity (a 3 axle truck weighing 36 tons). Because of load limits and width restrictions of the bridge, together with the difficulties of approaches to the structure, the bridge is to be dismantled in 1989. A new structure, designed to conform to the latest engineering standards, will be constructed upstream and adjacent to the existing historic McClure Bridge.

Note: The original document is on file with the "Plans and Specifications" for the McClure Bridge in the Office of the Whitman County Engineer, Department of Public Works, P.O. Box 430, Colfax, Washington 99111

WORK TO BE DONE.

The work to be done consists in furnishing and erecting a 20-foot Combination Truss bridge, 14 ft. roadway, at a point designated by the Board of county Commissioners, clearing site of old bridge, furnishing all necessary material for the structure. The contractor shall furnish the necessary material for the staging and false work; shall erect and adjust all metal and woodwork; put in place all floor timbers, guards, handrails, approaches, etc.; ready for use

PLANS

A complete set of plans and specifications shall be furnished by the Board of County Commissioners to the contractor.

DETAILS OF CONSTRUCTION.

The members attached to pins shall be packed close together and all spaces over one fourth of an inch in diameter shall be filled with wrought iron filling rings. The diagonal having the greatest stress shall be put on first, followed by the next diagonal. The eyebar of the lower chord having the greatest stress is then put in place, followed by the next eyebar. The centers are faced at the center of the pin between the stirrup and packed.

SCREW ENDS.

Upset screw ends on all rods must be of standard size, 15% greater than the body of the bar.

TURNBUCKLES.

Turnbuckles must be of open type and of approved pattern.

MINIMUM SIZE OF RODS.

In no case shall the rods be less than 3/4 of an inch in diameter. All bars and rods in lateral, longitudinal and sway system must be securely clamped at their intersection. All members must be free from twists and bends. Portions exposed to view must be neatly finished. The screws on lateral struts shall be screwed onto the upper pin as shown on plans.

EYE BARS.

All eyebars shall be of solid forged steel, of approved quality and standard size.

AREA.

The excess in head shall be standard and not less than 3% of the body of the bar. Bars must be free from flaws and of full thickness in the neck. The holes shall be in the center of the head and on the center line of the bar. Bars may vary 1/32 of an inch from the ordered length, but bars on the same item must not vary 1/50 of an inch in length.

RODS.

Rods for counters and laterals shall be loop rods of standard size, in case of bent loops, as in the upper lateral bracing, the head shall be packed so as to hold it securely at right angles to the pin.

PINS.

All pin holes in castings shall be rimmed to give a good bearing throughout. The holes shall not be over 1/50 of an inch in excess of the diameter of the pin.

NUTS.

Nuts on pins shall be of wrought steel. There shall be a washer under each nut or else Locks Nuts will be used. All pins on the lower chord shall be of one size unless otherwise shown.

GAMBER.

The bridge shall be cambered by giving the panel of the top chord an excess in length in the proportion of 1/4 of an inch to every ten feet.

WORKMANSHIP.

All workmanship shall be first class in every particular.

RAILING.

Railing shall be placed on each side of the structure throughout its entire length. It shall be made of vertical posts, spaced not more than ten feet from center to center, each securely bolted to the out side stringer with two 1/2 inch bolts; a hub plank two inches by ten inches (2"x10") and a two inch by four inch (2"x4") frieze board at

Top of posts; a two inch by six inch (2"x6") laid flat on top. All planking to be securely nailed to posts with 20d nails.

STRINGERS.

Stringers shall be of size shown on plans and spaced two feet from center to center.

TRUSS MEMBERS.

All truss members shall be of size shown on plans. They shall be surfaced to allow for painting. All cases where truss members butt against castings or against each other, they shall be given two coats of white lead, the first coat of which must have become thoroughly dry before the second is applied.

FLOORING.

All flooring shall be four inches thick, eight inches wide preferred. The flooring shall be firmly nailed to the stringers with not less than six inch spikes.

QUALITY OF MATERIAL.

All truss members, stringers, floor beams and bents shall be strictly first class Washington (Douglas) Fir, straight grained, sawed true, cut from large trees, out of wind, free from wind shakes, large wanes, large loose knots, decayed or sap wood, or other defects impairing its strength and durability. Flooring and rails may be other than Washington Fir. All timbers must have the approval of the County Commissioners or some person duly authorized by them to inspect the work.

CAST IRON.

All castings shall be of tough, gray iron, free from cold shuts or injurious blow holes, true to form and thickness and of work-manlike finish. A blow from a hammer shall produce an indentation on the rectangular edge of the casting with out flaking the metal. Sample pieces one inch square, cast from the same heat of metal in sand molds shall be capable of sustaining on a clear span of twelve inches a central load of twenty four hundred pounds (2400#). All pin holes shall be on axial lines of connecting members. Lugs shall be cast on the ~~top~~-SUR-face of castings to hold members in place. Holes shall be made in all pockets or recesses in castings to allow water to run out.

PAINTING.

All iron work before leaving the shop shall be thoroughly cleaned from rust and loose scales and be given one good coat of mineral paint, well worked into all joints and open spaces. After erection the bridge shall be thoroughly cleansed from all loose scales, rust, shavings, filings, shriveled paint, oil, grease, dirt or any foreign substance. It shall be thoroughly and evenly painted with two additional coats of paint mixed with pure linseed oil. The paint shall be of good quality and subject to the approval of the Superintendent in charge. Pins, bored pin holes and all threads shall be coated with white lead and tallow before being shipped from the factory. Pieces which are not accessible for painting after erection shall have two coats of paint before erection. All recesses which will retain water or through which water will enter must be filled with thick paint or some water proof cement before receiving the final painting. This material must be subject to the approval of the superintendent in charge. The first coat of paint must become thoroughly dry before the second is applied.

SUBSTRUCTURE.

There shall be two bents under each end of the structure, ~~the end of the bridge resting on one, the approach on the other.~~

APPROACHES.

Approaches shall be built same as main structure of the bridge with same kind of material and dimensions. Height of bents of approaches drop and distance apart shall be as shown on cross section of profile.

REFERENCES

- Anderson Map Company. 1910 Plat Book of Whitman County Washington. Seattle.
- Fuller, John F., comp. Atlas of Whitman County, Washington, 1895.
- Gies, Joseph. Bridges and Men. Garden City, New York: Doubleday and Company, 1963.
- Hitchman, Robert. Place Names of Washington. Published by The Washington State Historical Society, 1985.
- Holstine, Craig; Lindeman, Glen; Petersen, Keith; Reed, Mary. Whitman County Historic Resource Survey. Prepared for the Washington State Office of Historic Preservation, 1986.
- Jacobs, David, and Neville, Anthony E. Bridges, Canals, and Tunnels. American Heritage Publishing Co., Inc., in association with the Smithsonian Institution, 1968.
- Palouse Town and Country Study Program, Report of History Committee. The Palouse Story. Self published, 1962.
- Petersen, Keith C. Company Town: Poulatch, Idaho, and the Poulatch Lumber Company. Pullman, Washington: Washington State University Press, 1987.
- Thorpe, Bryan. Interview with Robin Bruce, 22 June 1989.
- Whitman County Genealogical Society, comp. Celebrating Families of Whitman County Vol. 1. 1988.
- Whitman County, Washington. "Bridge Record--Whitman County, Washington," 1953. Department of Public Works, Colfax, Washington.
- Whitman County, Washington. "Bridge Report," McClure Bridge, 1909. Department of Public Works, Colfax, Washington.
- Whitman County, Washington. Commissioner's Journal "P", 1908. Auditor's Office, Whitman County Courthouse, Colfax, Washington.
- Whitman County, Washington. Deeds 140, Phelps to Whitman County, quit claim deed. 18 November 1908. Whitman County Courthouse, Colfax, Washington.
- Whitman County, Washington. "Profile McClure Bridge," 1908. Department of Public Works, Colfax, Washington.

Whitman County, Washington. McClure Bridge Replacement, Alvergott Road, Whitman County, Washington, Environmental Assessment and Programmatic Section 4(F) Statement. Department of Public Works, Colfax, Washington.

Whitman County, Washington. "Plans and Specifications, McClure Bridge, 1908." Department of Public Works, Colfax, Washington.

Whitman County, Washington. "Plat of McClure Bridge," surveyed 28 October 1908. Department of Public Works, Colfax, Washington.

Whitman County, Washington. Survey Field Book, No. 12, Department of Public Works, Colfax, Washington.